

### **REMARKS**

In the Action, claims 1-22 are rejected. In response, claims 1-5, 18 and 22 are amended, and claim 17 is cancelled.

The claims are amended to remove the parentheses as suggested in the Action. The independent claims are also amended to recite the water-absorbent resin (A) being a surface-crosslinked water-absorbent resin obtained by surface-crosslinking the polymerization reaction product from the acid group containing unsaturated monomer. This feature is supported by the specification and original claim 17.

In view of these amendments and the following comments, reconsideration and allowance are requested.

### **Rejection of Claims 1, 8, 9, 11, 17-19 and 22**

Claims 1, 8, 9, 11, 17-19 and 22 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,127,454 to Wada et al. Wada et al. is cited for disclosing a water-absorbing agent.

Wada et al. does not disclose or suggest a particulate water-absorbent resin composition comprising a surface-crosslinked water-absorbent resin obtained by polymerizing an acid-group-containing unsaturated monomer and surface-crosslinking the resulting resin where the composition including the surface-crosslinked water-absorbent resin has a particle size in the range of 850 to 150  $\mu\text{m}$ , but not including 850  $\mu\text{m}$ . The passages in Wada et al. referred to in the Action disclosing the particle size of the resin refer to the water-absorbent resin before surface-crosslinking. For example, the passage in column 6, lines 54-61 of Wada et al., refers to the average particle diameter of the water-absorbent resins “resultant from the above mentioned polymerization”. The polymerization steps referred to in this passage of Wada et al. do not refer to a surface-crosslinking step. The particle size of the water-absorbent resin referred to in

column 11, lines 1-15 of Wada et al. is the particle size of the resin particles that have not been surface-crosslinked. The passage in column 11 specifically refers to the particle size of the water-absorbent resin, which is classified to a particle size range of 106 to less than 500  $\mu\text{m}$ , and is thereafter surface-crosslinked. Thus, Wada et al. does not disclose a surface-crosslinked water-absorbent resin having a particle size in the range of 850 to 150 $\mu\text{m}$ , but not including 850  $\mu\text{m}$ , in an amount of not less than 90 wt%.

The surface-crosslinking step as recognized by those skilled in the art results in changes in the particles of the water-absorbent resin. In particular, the surface-crosslinking step in the present invention includes water or other solvent, which results in changes in the state of the particles. The water or solvent used in the surface-crosslinking step act as a binder which results in coagulation of the particles. Wada et al. does not control the particle size after the surface treatment step as in the present invention. Referential Example 1 of Wada et al. controls the particle size prior to the surface treatment step. There is no disclosure of controlling the particle size after the surface treatment step of Wada et al. In contrast, the claimed invention recites the particle size of the resulting surface-crosslinked water-absorbent resin.

The particle size of the surface-crosslinked water-absorbent resin and the presence of the tetra- or more functional polyol on the surface of the resin particles result in an increase of the liquid permeability and the liquid-sucking-up property. These improved properties would not have been expected by one skilled in the art in view of Wada et al.

The passages of Wada et al. referred to in the Action refer to the crosslinking agent which is reacted with the water-absorbent resin. The polyol disclosed in Wada et al. functions as a crosslinking agent, so that the polyol reacts with the resin. Wada et al. provides no suggestion to one skilled in the art that the polyol remains after the heating step used for crosslinking the resin.

In view of the deficiencies of Wada et al., independent claim 1 is not anticipated.

As noted above, Wada et al. discloses the polyol as a crosslinking agent which is heated to react with the water-absorbent resin particles. Wada et al. provides no suggestion that the polyol remains after the crosslinking step. Thus, Wada et al. does not disclose or suggest a tetra- or more functional polyol in the range of 0.01 to 20 wt% relative to the crosslinked water-absorbing resin (A) in the water-absorbent resin composition of claim 8. The amounts of the surface-crosslinking agents disclosed in Wada et al. refer to the amounts before reacting in the crosslinking step and do not correspond to the amount of a tetra- or more functional polyol remaining on the surface of surface-crosslinked water-absorbent resin particles in a particulate water-absorbent resin composition. Wada et al. also does not disclose a sugar alcohol at least on the surfaces of a surface-crosslinked water-absorbent resin as in claim 9, the water absorption capacity under load of the particulate water-absorbent resin composition of claim 11, in combination with the features of claim 1.

Independent claim 18 is also not anticipated by Wada et al. for the reasons discussed in connection with claim 1. Wada et al. does not disclose a surface-crosslinked water-absorbent resin having particles in the range of 850 to 150  $\mu\text{m}$ , but not including 850  $\mu\text{m}$ , in an amount of not less than 90 wt%.

Wada et al. also does not disclose the step of mixing a surface-crosslinked water-absorbent resin (A) with a tetra- or more functional polyol (B) as in claim 18. Wada et al. refers only to adding the surface-crosslinking agent to the water-absorbent resin particles and heating to crosslink the resin particles. Wada et al. clearly does not disclose or suggest to one skilled in the art the step of mixing a surface-crosslinked water-absorbent resin and a tetra- or more functional polyol together as in the claimed invention. Accordingly, independent claim 19 is not anticipated by Wada et al.

Wada et al. also does not disclose the step of mixing a surface-crosslinked water-absorbing resin (A) and a sugar alcohol as a tetra- or more functional polyol as in claim 19, either alone or in combination with the features of claim 18.

Claim 22 depends from claim 18 and recites the water-absorbent resin (A) being obtained by reacting the polymerization reaction product with a surface-crosslinking agent (C) that is different from the tetra- or more polyfunctional polyol (B). As noted above, Wada et al. does not disclose mixing a surface-crosslinked water-absorbent resin and a tetra- or more functional polyol (B). Wada et al. further fails to disclose surface-crosslinking the polymerization reaction product with a surface-crosslinking agent that is different from the tetra- or more functional polyol that is then mixed with the surface-crosslinked water-absorbent resin particles. Accordingly, claim 22 is not anticipated by Wada et al.

In view of the deficiencies of Wada et al. and for the reasons discussed above, the claims are not anticipated.

#### **Rejection of Claims 4-7, 10, 12-16 and 20**

Claims 4-7, 10, 12-16 and 20 are rejected under 35 U.S.C. § 102(b), or in the alternative under 35 U.S.C. § 103(a), as being obvious over Wada et al. The rejection is based on the position that the claimed properties are either inherent or obvious over Wada et al.

For the reasons discussed above, independent claims 1 and 8 are not anticipated by Wada et al. Furthermore, Wada et al. does not suggest to one skilled in the art a water-absorbent resin composition comprising a surface-crosslinked water-absorbent resin and a tetra- or more functional polyol on the surfaces of the surface-crosslinked water-absorbent resin particles. Therefore, the resulting water-absorbent resin composition of the claimed invention is not the same as the water-absorbent resin particles of Wada et al. Accordingly, the properties of the claimed invention are not inherent or obvious over Wada et al.

The Action does not provide a sufficient rationale for the position that the liquid distribution velocity and water absorption capacity without load of the claimed water-absorbent resin composition of claim 4 are inherent in the water-absorbent resin particles of Wada et al. The water-absorbent resin particles of Wada et al. also do not inherently have the claimed OH/C ratio of 0.03 to 0.15 as in claim 5, the weight average particle diameter of the surface-crosslinked water-absorbent resin (A) of claim 7 in combination with the features of claim 1.

For the reasons discussed above, Wada et al. does not disclose or suggest a tetra- or more functional polyol (B) on at least the surfaces of a crosslinked water-absorbent resin as in claim 6, in combination with the features of claim 1, the absorption capacity without load of claim 10, the saline flow conductivity of claim 12, the absorption capacity without load and liquid-sucking-up rate of claim 13, the absorption capacity under load of claim 14, the saline flow conductivity of claim 15, the weight average particle diameter of claims 16 and 20, either alone or in combination with the features of independent claims 1 and 18.

In view of the above comments, the claims are not anticipated by or obvious over Wada et al.

### **Rejection of Claims 1-20 and 22**

Claims 1-20 and 22 are rejected under 35 U.S.C. § 102(b) as being anticipated by or in the alternative under 35 U.S.C. § 103(a) as being obvious over JP 2002-539281A and the U.S. equivalent U.S. Patent No. 6,605,673 to Mertens et al.

Mertens et al. does not disclose or suggest a particulate water-absorbent resin composition comprising a surface-crosslinked water-absorbent resin and a tetra- or more functional polyol at least on the surface of the crosslinked water-absorbent resin as in the claimed invention. Mertens et al. also does not disclose the claimed particle size of the surface-crosslinked water-absorbent resin being in the range of 850 to 150  $\mu\text{m}$ , but not including 850

μm, in an amount of not less than 90 wt% in the water-absorbent resin composition. The passages referred to in the Action of Mertens et al. refer to the particle size after the polymerization step but prior to the surface-crosslinking of the resin particles. As discussed above, one skilled in the art recognizes that surface-crosslinking changes the characteristics and properties of the resin particles. Thus, the particle size of surface-crosslinked resin particles of Mertens et al. are not the same as the particle size of the particles disclosed in Mertens et al. before surface-crosslinking.

For example, the particle size of the resin referred to in column 6, lines 47-49 of Mertens et al. specifically refer to the polymer beads obtained by inverse suspension polymerization or by drying and powdering the gel mass obtained from the solution polymerization. Thus, the particle size disclosed in Mertens et al. is clearly not a surface-crosslinked water-absorbent resin as in the claimed invention.

As noted in the Action, Mertens et al. discloses surface-crosslinking the absorbent polymer products by treating with a surface-crosslinking agent. The resin and the crosslinking agents are mixed together, and thereafter, subjected to a heat treatment as disclosed in column 7, lines 19-53. As recognized by those skilled in the art, the heat treatment causes the surface-crosslinking agent to react with the polymer particles. Thus, after the heat treatment step, the polyols or other crosslinking agents are no longer present, but are consumed in the crosslinking reaction. Mertens et al. provides no suggestion to one skilled in the art that the polyol used as a surface-crosslinking agent is present at least on the surfaces of the surface-crosslinked water-absorbent resin. Therefore, Mertens et al. does not inherently disclose a water-absorbent resin composition having a tetra- or more functional polyol at least on the surfaces of surface-crosslinked water-absorbent resin having a particle size in the range of 850 to 150 μm, but not including 850 μm, as in claims 1 and 2. Therefore, independent claims 1 and 2 are not anticipated by or obvious over Mertens et al.



For the reasons discussed above, Mertens et al. does not disclose a surface-crosslinked water-absorbent resin (A) having the claimed particle size as in claim 4. Thus, the product disclosed in Mertens et al. does not inherently have a liquid distribution velocity or water absorption capacity without load as defined in independent claim 4 or the OH/C ratio of independent claim 5. Therefore, independent claims 4 and 5 are not anticipated by or obvious over Mertens et al.

The dependent claims are also not anticipated by or obvious over Mertens et al. as reciting additional features of the invention that are not disclosed or suggested in combination with the features of the independent claim from which they depend. For example, Mertens et al. does not disclose the particle size of claim 3, in combination with the features of claim 2, a tetra- or more functional polyol (B) at least on the surfaces of the surface-crosslinked water-absorbent resin particles of claim 6, in combination with the features of claim 4.

Mertens et al. also does not disclose the weight average particle diameter and particle size distribution of claim 7, the amount of the tetra- or more polyfunctional polyol (B) at least on the surfaces of the surface-crosslinked water-absorbent resin (A) as in claim 8, the polyol being a sugar alcohol as in claim 9, the water absorption capacity without load of claim 10, the water absorption capacity under load of claim 11, the saline flow conductivity of claim 12, the water absorption capacity without load and liquid-sucking-up rate of claim 13, the absorption capacity under load of claim 14, and the saline flow conductivity of claim 15, the weight average particle diameter of claim 16, in combination with the features of claim 1.

Mertens also does not disclose a process for the production of a particulate water-absorbent resin composition including the step of mixing a surface-crosslinked water-absorbent resin (A) having particles in the range of 850 to 150  $\mu\text{m}$ , but not including 850  $\mu\text{m}$ , and a tetra- or more functional polyol (B). The passages referred to in the Action disclose mixing the water-absorbent resin particles before surface-crosslinking with the surface-crosslinking agent. There

is no suggestion in Mertens et al. of mixing a surface-crosslinked water-absorbent resin and a tetra- or more functional polyol as in independent claim 18. Furthermore, Mertens et al. does not disclose a surface-crosslinked water-absorbent resin having the claimed particle size. Therefore, independent claim 18 is not anticipated by or obvious over Mertens et al.

Mertens et al. also does not disclose mixing the surface-crosslinked water-absorbent resin (A) and a sugar alcohol as in claim 19, the surface-crosslinked water-absorbent resin (A) having the weight average particle diameter and particle size distribution of claim 20, in combination with the features of claim 18.

Mertens et al. further fails to disclose surface-crosslinking the resin particles with a surface-crosslinking agent that is different than the tetra- or more functional polyol (B) added to the resulting surface-crosslinked water-absorbent resin particles as in claim 22.

#### **Rejection of Claim 21**

Claim 21 is rejected under 35 U.S.C. § 103(a) as being obvious over Wada et al. or JP 2002-539281A and the U.S. equivalent U.S. Patent No. 6,605,673 to Mertens et al.

The rejection is based on the position that the time and temperature of the crosslinking step of the cited patents are within the level of skill in the art to “optimize” the cure conditions. Obviousness is not established merely by the ability of the one to carry out a step. Obviousness requires that the step actually be obvious based on the disclosure of the cited patents. The Action provides no basis for the position that it would have been obvious to control the time and temperature or the crosslinking step as asserted. Wada et al. and Mertens et al. specifically disclose the step to surface crosslink the resin. Therefore it would be contrary to the teachings of the cited patents to “control the time and temperature” to provide 10 to 90% of a tetra or more functional polyol will remain since this would not result in the surface crosslinked product sought by Wada et al. and Mertens et al. Moreover, adding a crosslinking agent without actually

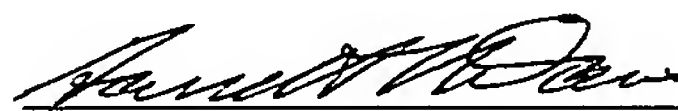


crosslinking the resin is clearly not an intended result of Wada et al. and Mertens et al. and is clearly not an optimizing step as suggested in the Action.

Mertens et al. and Wada et al. do not disclose a heat treatment step whereby 10 to 90% of the tetra- or more functional polyol (B) will remain unreacted in the particulate water-absorbent resin composition as in claim 21. As noted above, Mertens et al. and Wada et al. disclose only combining the water-absorbent resin with the surface-crosslinking agent for surface-crosslinking the water-absorbent resin. It would not have been obvious to one skilled in the art to have 10 to 90% of the crosslinking agent of Mertens et al. or Wada et al remain unreacted. Applicants respectfully submit that the position in the Action that it would have been an obvious optimization of a crosslinking step is incorrect.

In view of the deficiencies of the cited patents, the claims are not anticipated by or obvious over Wada et al. and Mertens et al. Accordingly, reconsideration and allowance are requested.

Respectfully submitted,



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